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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/669,713

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Satoru Fukuoka

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EXAMINER

ECHELMMEYER, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

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ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/669,713	<b>Applicant(s)</b> FUKUOKA ET AL.	
	<b>Examiner</b> Alix Elizabeth Echelmeyer	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to the amendment filed May 11, 2009. Claims 1-10 are cancelled. Claims 11-27 are added and are rejected finally for the reasons given below.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. (US 6,063,522) in view of Sano et al. (US 2002/0086191), Tsutsumi et al. (US 2002/0182507), and Nemoto (US 6,596,430).

Regarding claims 11 and 12, Hamrock et al. teach a non-aqueous electrolytic solution for a lithium cell containing linear ethers such as diethylene glycol dimethyl ether (DMG) (column 13 lines 52-59).

As for applicants' claim 14 and 15, Hamrock et al. teach the use of conductive salts in the electrolyte composition (column 11 lines 45-50). Hamrock et al. list lithium bis (trifluoromethanesulfonyl) imide and lithium bis (pentafluoroethanesulfonyl) imide as preferred conductive salts (column 13 lines 20-25).

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Regarding claims 16-19, Hamrock et al. teach  $\text{Li}_x\text{Mn}_2\text{O}_4$  and  $\text{Li}_x\text{MnO}_2$  as suitable cathode materials (column 14 lines 49-51).

Further regarding claims 11 and 12, Hamrock et al. fail to teach the use of a separator having a melting point greater than 185 degrees Celsius.

Sano et al. teach the use of a separator in a battery cell that is capable of withstanding high temperatures ([0015]). Sano et al. teach that polyphenylene sulfide may be used as the separator, the same material used as the separator in the specification of the instant invention (claim 4 of Sano et al.).

Sano et al. further teach that the separator would be capable of withstanding high temperatures in order to suppress the vaporization of the electrolyte ([0015]).

It would be desirable to use the polyphenylene sulfide separator of Sano et al. in the battery of Hamrock et al. in order to suppress the vaporization of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polyphenylene sulfide separator of Sano et al. in the battery of Hamrock et al. in order to suppress the vaporization of the electrolyte.

With further regard to claims 11 and 12 and regarding claim 13, Hamrock et al. in view of Sano et al. fail to teach a subsidiary component, specifically polypropylene, of the non-aqueous electrolyte in the amount of less than 100% by volume.

Tsutsumi et al. teach a nonaqueous electrolyte solvent for a lithium battery made up of a combination of cyclic carbonates and chain carbonates in an arbitrary combination (abstract; [0097]).

Nemoto teaches a lithium secondary battery having a blended nonaqueous solvent component of a nonaqueous electrolyte (abstract; column 5 lines 20-29).

Nemoto further teaches that the blend of the nonaqueous solvent is designed such that the boiling point of the solvent is tailored such that the electrolyte is prevented from boiling or evaporating when transported (column 6 lines 58-65).

Nemoto additionally teaches that the mixture should contain a main component of a single solvent in the amount of 98% or more, with the subsidiary components being 2% or less (column 8 lines 48 - column 9 lines 3).

The skilled artisan, based on the teachings above, would have been motivated to make the solvent of Hamrock et al. a mixed solvent, such as taught by Tsutsumi et al., containing the DMG component and a cyclic carbonate, such as propylene carbonate. The skilled artisan would further have been motivated, in light of the teachings of Nemoto, to tailor the blend of DMG to propylene carbonate such that the boiling point of the mixed nonaqueous solvent would be such that the electrolyte would not be affected by the temperatures associated with transportation of the battery. Further, the skilled artisan in light of Hamrock et al. in view of Nemoto would create the blended solvent such that the main component, DMG, would be of an amount of 98% or more.

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Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to blend a chain carbonate, such as propylene carbonate, into the DMG solvent of Hamrock et al. in view of the teachings of Tsutsumi et al. and Nemoto in order to provide an electrolyte capable of withstanding transportation.

4. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al., Tsutsumi et al. and Nemoto as applied to claims 16 and 17 above, and further in view of Takahashi et al. (US 5,766,791).

The teachings of Hamrock et al., Sano et al., Tsutsumi et al. and Nemoto as discussed above are incorporated herein.

Hamrock et al. in view of Sano et al., Tsutsumi et al. and Nemoto fail to teach the battery casing assembly of claims 20 and 21.

Takahashi et al. teach a battery having an outer casing, a cap, and an insulating gasket (abstract; Figure 1).

Takahashi et al. further teach a safety venting valve in the cap to prevent explosion of the battery due to high internal pressure (abstract).

Takahashi et al. fail to explicitly teach the melting temperature of the gasket, but it is the position of the examiner that the gasket would inherently have a high melting temperature because the case of the battery would not function as intended if the gasket melted prior to the safety vent functioning to release the buildup of internal pressure.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the battery housing of Takahashi et al. in order to provide a safety venting mechanism to prevent explosion.

5. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al., Tsutsumi et al. and Nemoto as applied to claims 11 and 12 above, and further in view of Sakai et al. (US 2002/0122984)

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The teachings of Hamrock et al. in view of Sano et al., Tsutsumi et al. and Nemoto as discussed above are incorporated herein.

Hamrock et al. in view of Sano et al., Tsutsumi et al. and Nemoto teach the lithium cell of claims 11 and 12 but fail to teach that the anode is a lithium-aluminum alloy.

Sakai et al. teach a cell having spinel lithium manganese oxide as the cathode active material and a lithium-aluminum alloy in the anode ([0017], [0022]).

Sakai et al. further teach that the battery having the above described anode and cathode materials has excellent properties at high temperatures.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a lithium-aluminum alloy as taught by Sakai et al. in the battery of Hamrock et al. in view of Sano et al., Tsutsumi et al. and Nemoto since the resulting battery would have excellent properties at high temperatures.

6. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al., Tsutsumi et al., Nemoto and Sakai et al. as applied to claims 22 and 23 above, and further in view of Takahashi et al.



The teachings of Hamrock et al., Sano et al., Tsutsumi et al., Nemoto, Sakai et al. and Takahashi et al. as discussed above are incorporated herein.

Hamrock et al. in view of Sano et al., Tsutsumi et al., Nemoto and Sakai et al. teach the claimed battery but fail to teach the claimed housing.

Takahashi et al. teach a battery having an outer casing, a cap, and an insulating gasket (abstract; Figure 1).

Takahashi et al. further teach a safety venting valve in the cap to prevent explosion of the battery due to high internal pressure (abstract).

With regard to claims 26 and 27, the inner part of the cap, or explosion-proof valve, is made of aluminum (column 1 lines 23-24).

Takahashi et al. fail to explicitly teach the melting temperature of the gasket, but it is the position of the examiner that the gasket would inherently have a high melting temperature because the case of the battery would not function as intended if the gasket melted prior to the safety vent functioning to release the buildup of internal pressure.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the battery housing of Takahashi et al. in order to provide a safety venting mechanism to prevent explosion.

### ***Response to Arguments***

7. Applicant's arguments have been considered but are moot in view of the new grounds of rejection, see above.

The examiner will address Applicant's arguments concerning the allegations of unexpected results as well as the arguments concerning the melting point of the gasket.

Regarding the allegations of unexpected results, the examiner finds that the data provided by Applicant is not sufficient to show unexpected results.

Applicant is directed to the MPEP at section 716.02(d). Here, it is stated that the unexpected results must be commensurate in scope with the claimed invention, and that Applicant must demonstrate the criticality of the claimed range. Specifically, it is stated that "to establish unexpected results over a claimed range, applicants should compare a *sufficient number of tests* both inside and *outside the claimed range* to show the criticality of the claimed range" (emphasis added by examiner).

The examiner finds that Applicant has not shown a sufficient number of tests outside the claimed range to show criticality of the claimed range. The comparative examples of Graphs 1 and 2 of the Declaration filed August 5, 2008 do not compare tests outside the claimed range to sufficiently show the criticality of the claimed range as required by the MPEP. There is no data provided for the amount of DMG from 85% to 90%. If 90% is purported to be the endpoint of the critical range, data points just outside this range must be provided to show that the critical range does not begin at, for example, 86% DMG.

As for Applicant's arguments concerning the melting point of the gasket, the examiner is unconvinced. The examiner holds that the skilled artisan would recognize

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that the gasket would necessarily have a high enough melting point so as to prevent the escape of gases at any operating temperatures of the battery.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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